MITIGATION MEASURES

The following mitigation measures and commitments are not subject to change or modification without the prior written approval of the Federal Highway Administration.

Town of Marana Responsibilities:

1. The Town of Marana and the Arizona Department of Transportation would participate in an intergovernmental agreement, which would include the environmental mitigation contained within this document.
2. The Town of Marana would widen the low flow channel of the Santa Cruz River to prevent an unacceptable rise in floodwater elevations within the 100-year floodplain. (Refer to page 4-19)
3. During final design, the Town of Marana would give the local floodplain administrator the opportunity to review project plans. (Refer to page 4-19)
4. The Town of Marana would obtain an individual Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers and Section 401 Water Quality Certification from the Arizona Department of Environmental Quality before construction commences. (Refer to page 4-21)
5. To comply with Section 402, a Stormwater Pollution Prevention Plan would be prepared for this project by the Town of Marana. (Refer to page 4-22)
6. Prior to construction, the Town of Marana would develop a revegetation plan that would incorporate the mitigation discussed below. (Refer to page 4-31) This revegetation plan would be provided to the contractor. Mitigation measures would include revegetation of impacted areas along the roadway and the riparian vegetation along the Santa Cruz River. Mitigation would include:

    - Disturbed soils would be re-seeded using species native to the project vicinity and would mirror the current plant composition to the extent possible.
    - Within upland areas, trees greater than 4 inches diameter at breast height and Saguaro cactus that are removed would be replaced within the overall construction footprint at a 3:1 ratio. Vegetation would be replaced in kind with a minimum container size of 15 gallons. These replacements would not occur within the clear zone of the roadway.
    - Within the clear zone of the roadway, creosote bush seed would be utilized in order to facilitate quick replacement of vegetation cover.
    - Mesquite trees greater than 4 inches diameter at breast height that are removed within the high flow channel of the Santa Cruz River would be replaced at a 3:1 ratio within the overall project limits in accordance with the revegetation plan. Vegetation would be replaced in kind with a minimum container size of 15 gallons.

- Riparian trees greater than 4 inches diameter at breast height that are removed for construction would be replaced in kind at a 3:1 ratio with a minimum container size of 15 gallons.
- When fully restored, the vegetation within the Santa Cruz River would provide continuous tree cover through the project limits.
- The bottom of the bridges would be approximately 20 feet above the bottom of the low flow channel of the Santa Cruz River, which should provide sufficient height to allow pygmy-owls and other wildlife to move unimpeded under the bridges.
- The Town of Marana would provide water for all plantings outside the low flow channel of the Santa Cruz River for a period of two years to facilitate their establishment.
- The Town of Marana would monitor all plantings for a period of two years, starting at the time of planting, on a quarterly basis. Two yearly reports would be generated and submitted to the U.S. Fish and Wildlife Service and the Arizona Department of Transportation's Environmental and Enhancement Group discussing the progress of the revegetation effort.
- The revegetation plan would comply with the Arizona Native Plant Law, and Native Plant Protection Ordinances of the Town of Marana and Pima County. In addition, the revegetation plan would also include U.S. Army Corps of Engineers recommended mitigation measures for the Santa Cruz River Channel.
- The revegetation plan would be developed based on the objectives of the Tres Rio del Norte Feasibility Study. Tres Rio del Norte planning objectives related to vegetation on the Santa Cruz River include: creating a mesquite bosque at higher elevations from the Santa Cruz River bottom on terraces and over-bank areas; plant and establish cottonwood and willow tree plant communities along the wetted perimeter, and fringe area locations within the Santa Cruz River; established wetlands/Cienega at appropriate locations, to create a diverse and high value project habitat; and, reestablish desertscrub plant communities along the degraded upland portions of the Santa Cruz River corridor, emphasizing saltbush-wolfberry and mesquite associations as components.

7. The Town of Marana would develop a Native Plant Protection Plan in accordance with local ordinances. (Refer to page 4-36)
8. During design, a wetland delineation would be completed. In the event that jurisdictional wetlands are impacted by the preferred alternative, coordination with the U.S. Army Corps of Engineers would occur and appropriate permits would be obtained. (Refer to page 4-39).
9. During final design, invasive species surveys would occur to determine if invasive species are present. (Refer to page 4-40)

10. Structural elements such as walls, bridges, concrete barriers, and abutments would be constructed of materials with color and texture qualities that blend into the existing landscape. Architectural treatments would be applied to the proposed Twin Peaks Road bridge over I-10 and other visible structures to enhance the driver's perception of Marana and to be in accordance with similar projects on I-10 in the Tucson area. (Refer to page 4-44)
11. Erosion control techniques such as slope rounding would be utilized, as necessary, to minimize impacts to visual quality. (Refer to page 4-45)
12. Intersection lighting would be designed to minimize light pollution of night skies and limit glare into neighborhoods. (Refer to page 4-45)
13. Methods of reducing headlight impact to residents of Continental Ranch would be considered in final design. (Refer to page 4-45)
14. The need for sound mitigation walls would be reassessed during design. If walls would be required, the placement, type, and height would be determined during design. (Refer to pages 4-57)
15. The Town of Marana would resurface Twin Peaks Road west to Silverbell Road with rubberized asphaltic concrete to decrease the noise generation from the tire-pavement interface. (Refer to page 4-59)
16. Before construction, the Town of Marana would conduct detailed Phase I Site Assessments to assess site-specific potential for hazardous materials issues on parcels rated as high and medium priority. Additional investigation may include, but is not limited to, additional site reconnaissance and interviews with current and historical property owners. If parcels to be acquired involve structures, following the acquisition of the structure but prior to its demolition, the structures would be assessed for asbestos, lead-based paint, and other hazardous materials in accordance with State and Federal regulations. (Refer to page 4-65)
17. The Town of Marana would follow the terms and conditions of the Section 106 programmatic agreement for I-10 improvements between the I-10/I-19 interchange and Tangerine Road signed by SHPO, FHWA, ADOT, and the Advisory Council on Historic Preservation in 1993 (included in Appendix D) and subsequently amended. In addition, the Town of Marana would follow the SHPO recommendations to prepare a project specific treatment plan (see letter in Appendix D). (Refer to page 4-76)
18. Minor gaps in the cultural resources inventory would be addressed by the Town of Marana as final design proceeds. These include completion of the archeological survey on parcels that could not be surveyed previously along the eastbound I-10 frontage road and Linda Vista Boulevard because rights-of-entry could not be obtained. The Town of Marana would obtain archeological clearance before geotechnical testing for bridge and embankment piers. (Refer to page 4-76)

19. The Town of Marana would provide plans for UPRR review to ensure that the project met current UPRR standards for bridge design and that the sequencing of construction minimized temporary disruptions to train traffic. (Refer to page 4-99)
20. The Town of Marana would coordinate with the Cortaro-Marana Irrigation District prior to any modifications of the canal and construction would be coordinated so that the proposed improvements would not interfere with the supply of irrigation water during critical periods. (Refer to page 4-100)
21. The Town of Marana would maintain utility coordination throughout the course of the project and schedules for any utility adjustments would be coordinated closely to minimize interruptions and inconvenience to customers. (Refer to page 4-100)
22. Utility clearances obtained by the Town of Marana would be in accordance with the Arizona Department of Transportation requirements. (Refer to page 4-101)

Arizona Department of Transportation Tucson District Responsibilities:

1. The Town of Marana and the Arizona Department of Transportation would participate in an intergovernmental agreement, which would include the environmental mitigation contained within this document.
2. The Arizona Department of Transportation District Construction Office and the contractor will submit the Notice of Intent and the Notice of Termination to the Arizona Department of Environmental Quality and the Environmental Protection Agency. (Refer to page 4-22)

Arizona Department of Transportation Environmental and Enhancement Group Responsibilities:

1. To prevent damage to possible buried resources at the Stewart Brickyard archaeological site, a pre-construction testing plan would be developed and implemented for this site by the Town of Marana in consultation with Arizona Department of Transportation Environmental and Enhancement Group's Historic Preservation Team. (Refer to page 4-76)

Contractor's Responsibilities:

1. The terms and conditions of the Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers and Section 401 Water Quality Certification from the Arizona Department of Environmental Quality would be followed by the contractor for work affecting jurisdictional waters within the project area. (Refer to page 4-21)
2. The Arizona Department of Transportation District Construction Office and the contractor will submit the Notice of Intent and the Notice of Termination to the Arizona Department of Environmental Quality and the Environmental Protection Agency. (Refer to page 4-22)

3. The contractor would clean all earth-moving and hauling equipment prior to its entering the construction site to prevent the introduction of invasive species. (Refer to page 4-41)
4. Erosion control techniques such as slope rounding would be utilized, as necessary, to minimize impacts to visual quality. (Refer to page 4-45)
5. The contractor would monitor dust generation from the construction area and limit the amount of dust generated to a maximum opacity of 20 percent. (Refer to page 4-48)
6. If relocation of asbestos-containing water lines is required, the contractor would handle, transport, and dispose of the material in accordance with approved federal, state, and county asbestos handling procedures. This would include appropriate precautions to ensure that employees are not exposed to airborne asbestos fibers and that fibers are not released into the atmosphere. (Refer to page 4-66)

Standard Specifications included as Mitigation Measures:

1. Excess waste material and construction debris would be disposed of at sites supplied by the contractor in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction* Section 107.11 Protection and Restoration of Property and Landscape (2000 Edition). Disposal would be made at either municipal landfills approved under Title D of the Resource Conservation and Recovery Act, construction debris landfills approved under Article 3 of the Arizona Revised Statutes 49-241 (Aquifer Protection Permit) administered by the Arizona Department of Environmental Quality, or inert landfills. (Refer to page 4-12)
2. During construction, the contractor would follow *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 104.09 Prevention of Landscape Defacement; Protection of Streams, Lakes and Reservoirs (2000 Edition) and the Water Quality Standards in Title 18, Chapter 11 of the Arizona Administrative Code as administered by the Arizona Department of Environmental Quality. (Refer to page 4-45)
3. During construction, the contractor would control, reduce, remove or prevent air pollution in all its forms, including air contaminants, in the performance of the contractor's work in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 104.08 Prevention of Air and Noise Pollution (2000 Edition). (Refer to page 4-48)
4. During construction, the contractor would control construction noise in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 104.08 Prevention of Air and Noise Pollution (2000 Edition). (Refer to page 4-57)
5. According to *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction, Section 107 Legal Relations and Responsibility to Public* (2000 Edition) (Stored Specification 107HAZMT, 01/15/93), if previously unidentified or suspect hazardous materials are encountered during construction, work would stop at that location and the Town of Marana Engineer would be contacted to arrange for proper treatment of those materials. Such locations would be investigated and proper action implemented prior to the continuation of work in that location. (Refer to Page 4-66)
6. According to *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction*, Section 107.05 Legal Relations and Responsibility to Public, Archaeological Features (2000 Edition), if previously unidentified cultural resources are encountered during activity related to the construction of the project, the contractor would stop work immediately at that location and would take all reasonable steps to secure the preservation of those resources and notify the Engineer. The Engineer would contact the Arizona Department of Transportation Environmental Planning Group, Historic Preservation Team (602.712.8636) immediately and make arrangements for the proper treatment of those resources. Arizona Department of Transportation

would, in turn, notify the appropriate agency(ies) to evaluate the significance of those resources. (Refer to page 4-76)

7. Any material sources required for this project outside of the project area would be examined for environmental effects, by the contractor, prior to use, through a separate environmental analysis in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 1001 Material Sources (2000 Edition) (Stored Specification 1001.2 General), unless the facility has received prior clearance from the Environmental and Enhancement Group of the Arizona Department of Transportation. (Refer to page 4-101)

CHAPTER 1: INTRODUCTION

This environmental assessment (EA) is being prepared to comply with the National Environmental Policy Act (NEPA) of 1969 and the policies of the Federal Highway Administration (FHWA), as the lead federal agency. The EA process provides steps and procedures to evaluate the potential social, economic, and environmental impacts of a proposed action while providing an opportunity for public and local, state, or other agencies to provide input and/or comment. In addition, this EA provides FHWA and the Arizona Department of Transportation (ADOT) a detailed analysis to better examine and consider the level of impacts on any sensitive social, economic, and environmental resources and assists in the decision-making process.

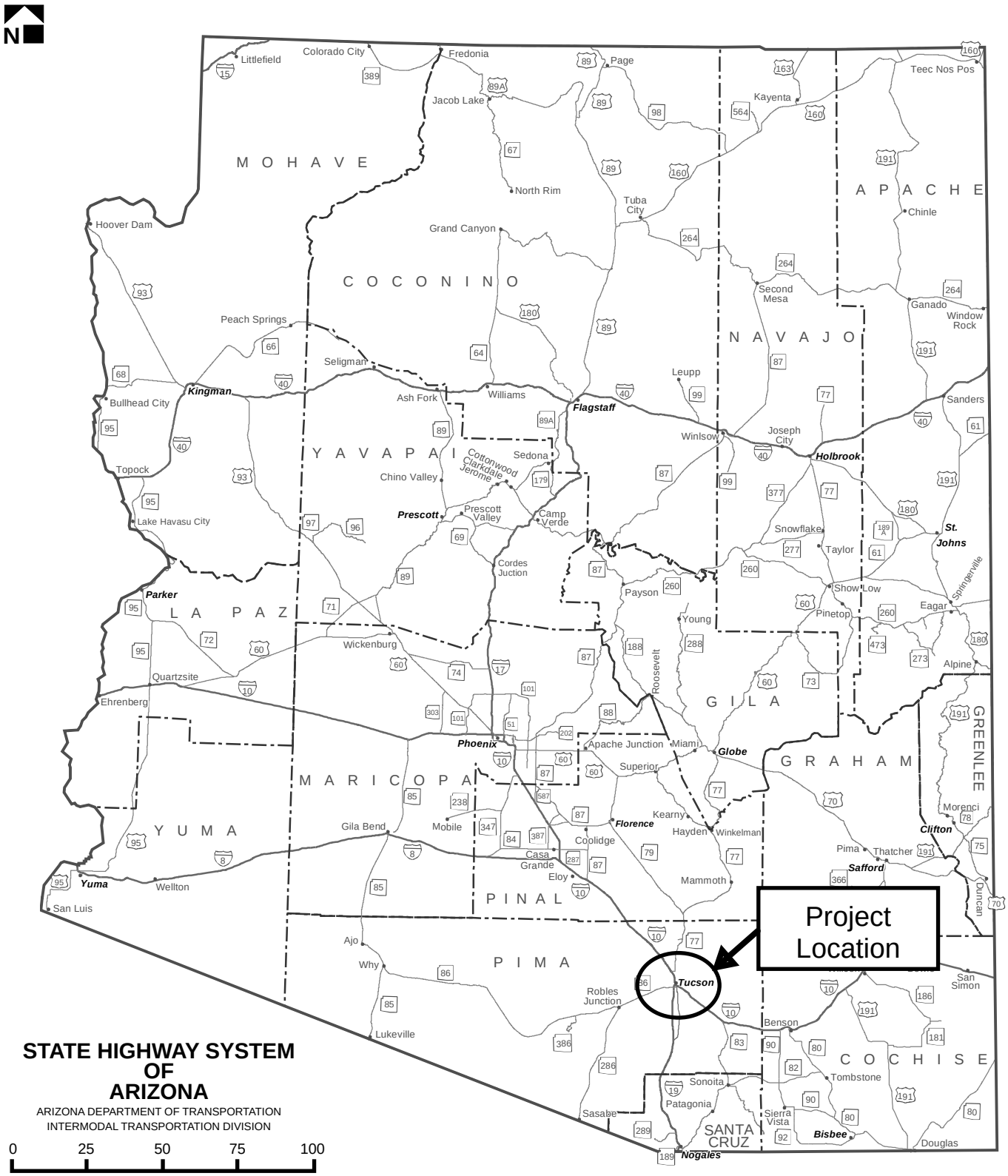
A companion document to this EA has been prepared. The companion document is entitled *Interstate 10 Traffic Interchange at Twin Peaks Road/Linda Vista Boulevard Initial Location Design Concept Report (DCR).* The DCR is a document prepared for ADOT, which documents the design concept for proposed improvements, substantiates recommendations, documents alternatives considered, and identifies environmental effects. The DCR contains a higher level of engineering design detail than this EA and readers who desire that level of detail are referred to that document.

Explanation of Project

The existing Interstate 10 (I-10) traffic interchanges (TI) at Avra Valley Road and Cortaro Road are approximately four miles apart; therefore, the Town of Marana, as part of its *Marana Master Transportation Plan*, proposed a new major arterial roadway that would cross the I-10 Corridor in the vicinity of Twin Peaks Road and provide additional access to and from I-10. ADOT's *I-10 General Plan, Ruthrauff Road to Tangerine Road (General Plan)* proposed the construction of a new I-10 TI in the vicinity of Twin Peaks Road, Linda Vista Boulevard, and El Camino de Mañana that would be an extension of the existing Twin Peaks Road in Marana. The *General Plan* also proposed a grade-separated crossing of this roadway with the Union Pacific Railroad (UPRR) because only one other grade-separated railroad crossing (Orange Grove Road) existed between Ruthrauff Road and Tangerine Road. According to Pima Association of Governments' (PAG) *2025 Regional Transportation Plan,* the new TI and roadway would serve a substantial amount of traffic both crossing and accessing I-10.

The proposed project would construct a new I-10 TI at Twin Peaks Road (hereinafter referred to as the Twin Peaks Road TI) approximately midway between the Avra Valley Road TI (milepost [MP] 242) and the Cortaro Road TI (MP 246) and would connect Twin Peaks Road on the west to El Camino de Mañana/Linda Vista Boulevard on the east. The proposed project location and vicinity are presented in Figures 1-1 and 1-2, respectively.

STATE MAP



STATE HIGHWAY SYSTEM OF ARIZONA

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

PROJECT NAME Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista

PROJECT NUMBER NH-010-D (AIW)

TRACS NO. 10 PM 236 H5838 01D

FIGURE 1-1

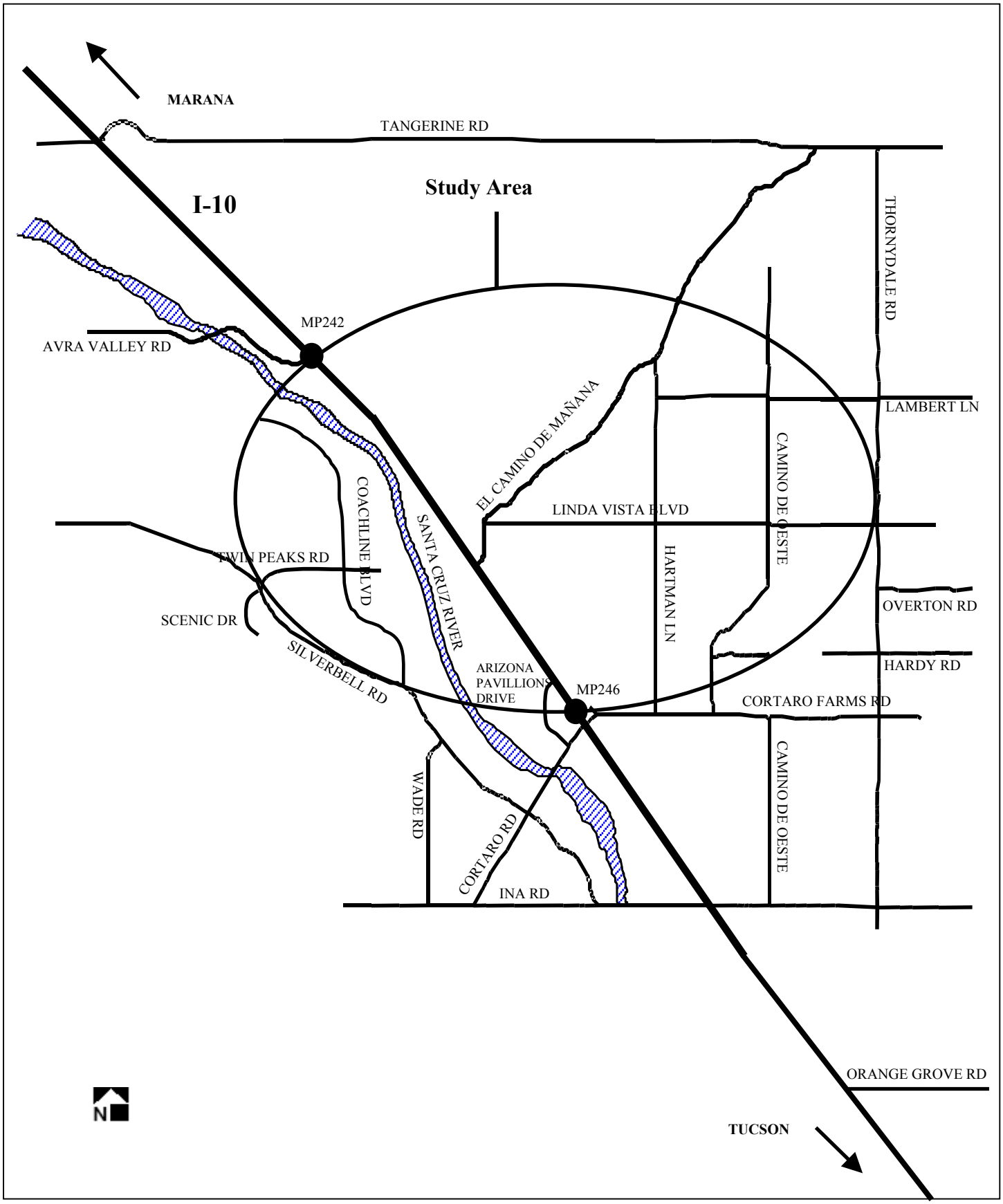


Figure 1-2

Study Area

The Twin Peaks Road TI would be grade-separated with I-10 and with the UPRR and would include intersections with the I-10 eastbound and westbound frontage roads, and a newly constructed business access/circulation roadway. Twin Peaks Road would cross the Santa Cruz River on two new bridges (one eastbound and one westbound) and the I-10 eastbound frontage road, which is currently a two-way frontage road, would be converted to a one-way frontage road. The purpose and need for the project is described in the next chapter and the proposed improvements are described in greater detail in Chapter 3, *Alternatives*.

The project area (the area where construction is expected to occur) occurs along I-10 at approximately MP 243. The project area will include slightly beyond the Twin Peaks Road tie-in on the west and slightly beyond the El Camino de Mañana/Linda Vista Boulevard intersection on the east. In addition, limited safety improvements are proposed along the I-10 frontage roads.

The study area is a much larger area. Federal guidelines suggest that the study area be large enough to: 1) treat environmental issues on a sufficiently broad scope to ensure that the project will function properly without requiring additional improvements elsewhere; 2) not restrict consideration of alternatives for other reasonably foreseeable transportation improvements; and, 3) give decision-makers and the public a clearer picture of the transportation requirements in the project area and a better understanding of the project purpose.

Therefore, the study area is defined as the area between the Avra Valley Road TI on the north and the Cortaro Road TI on the south and the area between the intersection of Twin Peaks Road and Silverbell Road on the west and the intersection of Linda Vista Boulevard and Thornydale Road on the east. These termini were selected because the Twin Peaks Road TI would be expected to influence traffic within this area.

Existing Roadway Network

The FHWA Draft Classification Map, dated 2003, classified I-10 as an urban principal interstate roadway. In the area of the proposed Twin Peaks Road TI, I-10 provides two lanes in each direction with a wide median and a posted speed limit of 75 miles per hour (mph). According to PAG, average daily traffic (ADT) volumes on the roadway vary from 52,100 vehicles per day (Vpd) north of the Avra Valley TI to 86,400 Vpd south of the Cortaro Road TI. Construction is underway on an I-10 widening project to add one through lane in each direction between the Tangerine Road and Cortaro Road TIs, which includes the Twin Peaks Road TI project area.

The nearest TIs to the area of the proposed improvements include the Avra Valley Road TI, approximately 2 miles north of the Twin Peaks Road TI, and the Cortaro Road TI, approximately 2 miles south of the Twin Peaks Road TI. At the Avra Valley TI, a diamond interchange, the westbound I-10 ramps merge with a one-way, one lane roadway that parallels I-10. The eastbound I-10 ramps are separate from the two-lane, two-way frontage road that runs parallel to I-10. The two ramp intersections with Avra Valley Road are unsignalized. The Cortaro Road TI is also a diamond interchange. All

Cortaro Road TI ramps merge with two-lane, one-way frontage roads. Both I-10 ramp intersections with Cortaro Road are signalized.

Frontage roads exist along both sides of I-10 in the vicinity of the Twin Peaks Road TI. The frontage road west of I-10 provides one lane in each direction allowing two-way travel from Avra Valley Road to Arizona Pavilions Drive (just north of the eastbound Cortaro Road off-ramp). The frontage road east of I-10 provides two lanes of one-way (westbound) travel from Cortaro Road to Avra Valley Road.

Twin Peaks Road from Silverbell Road to its eastern terminus west of the Santa Cruz River is classified as an arterial roadway by the Town of Marana, but Pima County classifies Twin Peaks Road as a major collector. Twin Peaks Road is under the jurisdiction of and maintained by the Town of Marana. Twin Peaks Road consists of two travel lanes in each direction with a raised landscaped median, shared use lanes, curb, gutter, and sidewalk. The posted speed limit is 35 mph. Access along Twin Peaks Road is restricted to connecting roadways. Traffic counts are available only east of Silverbell Road, where ADT volumes on the roadway are approximately 10,700 Vpd. Volumes near the eastern terminus of Twin Peaks Road are considerably less.

El Camino de Mañana from the I-10 westbound frontage road to Tangerine Road is classified as a collector roadway by the Town of Marana. Pima County classifies El Camino de Mañana from I-10 to Linda Vista Boulevard as an urban collector and a minor collector from Linda Vista Boulevard to Tangerine Road. El Camino de Mañana is under the jurisdiction of both the Town of Marana and Pima County, but is maintained by the Town of Marana through an intergovernmental agreement. The roadway provides one travel lane in each direction with no shared use lanes, curb, gutter, or sidewalks. The posted speed limit is 35 mph along El Camino de Mañana from I-10 to Tangerine Road. According to PAG, traffic volumes on El Camino de Mañana in this area reach approximately 500 Vpd. Access along El Camino de Mañana is unrestricted. El Camino de Mañana intersects with the I-10 westbound frontage road in an unlighted unsignalized "T"-intersection with stop-control on the El Camino de Mañana approach. El Camino de Mañana crosses the UPRR at-grade just east of its intersection with the I-10 westbound frontage road. El Camino de Mañana and Linda Vista Boulevard intersect in an unlighted unsignalized "T"-intersection with stop-control on the Linda Vista Boulevard approach.

Linda Vista Boulevard from El Camino de Mañana to Thornydale Road is classified as a collector roadway by the Town of Marana. Linda Vista Boulevard west of Hartman Lane is under the jurisdiction of the Town of Marana while Linda Vista Boulevard east of Hartman Lane is under the jurisdiction of Pima County; however, Linda Vista Boulevard is maintained by Pima County through an intergovernmental agreement. West of Camino de Oeste, Linda Vista Boulevard provides one travel lane in each direction with no bike lanes, curb, gutter, or sidewalks. East of Camino de Oeste, Linda Vista Boulevard provides one travel lane in each direction with intermittent shared use lanes, curb, gutter, and sidewalks. The posted speed limit is 45 mph. Access along the roadway varies from unrestricted in the western portion to restricted in the eastern portion. According to PAG, traffic volumes on Linda Vista Boulevard vary from 400 Vpd near El Camino de Mañana to 7,700 Vpd near Thornydale Road.

Other Modes of Transportation

The only continuous pedestrian and bicycle facilities (sidewalks 5 to 6 feet in width and paved shoulders of 6 to 8 feet in width) within the area are found along Twin Peaks Road from Silverbell Road to its eastern terminus. According to the PAG *Tucson Bike Map*, Twin Peaks Road from Silverbell Road to Coachline Road is designated as a Bike Route, while the roadway from Coachline Road to its eastern terminus is not designated. R17-3-407 of the Arizona Administrative Code prohibits bicycle use of I-10 in the vicinity of the Twin Peaks Road TI.

Trails within the area are currently under design or construction. The Santa Cruz River Shared Use Path is under construction and will be a paved trail for bicycle and pedestrian use that will connect with other community trails and bikeways, facilitating non-motorized access throughout the community and adjacent natural areas. This trail will follow the high flow channel of the Santa Cruz River and will cross Twin Peaks Road. The Marana segment of the De Anza National Historic Trail is under design and will follow and interpret the route of the 1775 De Anza expedition to San Francisco, California. This trail will be unpaved and suitable for equestrian use. The De Anza Trail will follow a circuitous route just outside the low flow channel of the Santa Cruz River and will connect with other equestrian trails that provide connections with nearby public open space and natural areas.

Public transportation within the Town of Marana is provided by Sun Tran, the fixed bus route transit provider for the City of Tucson, and Pima County Rural Transit, the transit provider for unincorporated Pima County. Neither Sun Tran nor Pima County Rural Transit currently provides service stops in the vicinity of the Twin Peaks Road TI. A Greyhound Bus Lines station is located on Sandario Road near the Marana TI, approximately 8 miles north of the Twin Peaks Road TI

Amtrak, which provides long distance intercity passenger rail service, passes through the Town of Marana. The only Amtrak station in Pima County is located at the Union Pacific Depot in downtown Tucson. The 1994 ADOT State Rail Plan Update identifies a future opportunity for providing a regional rail passenger system, which includes service between Tucson and Phoenix along I-10.

The Union Pacific Transportation Company provides freight rail service along I-10 for the central and southern portions of the state. The UPRR line runs parallel to and east of I-10 in the vicinity of the Twin Peaks Road TI.

CHAPTER 2: PROJECT PURPOSE AND NEED

Project Location

The proposed project involves the construction of a Twin Peaks Road TI on I-10 in the northwestern portion of the Tucson metropolitan area of Pima County, Arizona. The proposed project would occur primarily within the incorporated area of the Town of Marana, but also within the unincorporated area of Pima County. The Twin Peaks Road TI would be located approximately midway between the Avra Valley Road TI (MP 242) and the Cortaro Road TI (MP 246).

Background and Overview

Two studies, the *Marana Master Transportation Plan* completed in December 1989 and ADOT's *I-10 Design Concept Study (DCR), Ruthrauff Road to the Pima/Pinal County Line* completed in 1990, recommended a new I-10 TI between the I-10 interchanges at Cortaro and Avra Valley Roads. Both studies recommended that the new I-10 TI connect Twin Peaks Road to El Camino de Mañana/Linda Vista Boulevard. The *Marana Master Transportation Plan*, the first transportation plan developed for the Town of Marana, recommended the TI as part of a planned parkway consisting of four- and six-lane arterials that encircled the Marana Town Center (near MP 236). The *Marana Master Transportation Plan* recommended two new TIs: a southern TI at Twin Peaks Road and a northern TI at Hardin Road (approximately MP 234).

The ADOT I-10 DCR originally recommended the Twin Peaks Road TI to achieve desirable interchange spacing; however, as residential and commercial development increased in the area, the Twin Peaks Road TI was later seen as an important "reliever" for growing traffic congestion at the Cortaro Road TI. The DCR and the subsequent ADOT *I-10 General Plan, Ruthrauff Road to Tangerine Road* (1993) (*General Plan)* recommended a preliminary TI design which connected Twin Peaks Road and El Camino de Mañana and provided a grade separation with the Southern Pacific Railroad (now the UPRR).

FHWA requires that additions or revisions of access to the interstate system be justified in a Change of Access Report. As a result of the recommendations of the *General Plan*, the *Change of Freeway Access Report, I-10 Corridor Improvements General Plan Ruthrauff Road to Tangerine Road,* dated December 1991, was completed. This report contained an analysis of a Twin Peaks Road TI. The additional point of access to I-10 at Twin Peaks Road was approved in a memorandum from FHWA Administrator T.D. Larson on June 26, 1992, subject to the State's compliance with applicable Federal requirements.

One of these Federal requirements was to analyze the social, economic, and environmental effects of the improvement alternatives recommended in the *General Plan*. The *Final Environmental Assessment I-10 Corridor Improvements General Plan Ruthrauff Road to Tangerine Road* assessed 12 miles of I-10 between Tangerine Road

(MP 240.4) and Ruthrauff Road (MP 252.4) in 1993 (hereinafter this document is referred to as the *1993 EA*). Based on the social, environmental, and economic analyses in the *1993 EA*, the FHWA issued a Finding of No Significant Impact (FONSI) on October 29, 1993. Although a FONSI determination allows a project to proceed to design and construction, funding limitations have prevented project advancement until now. Because of the time that has elapsed since the FONSI was issued and the changes in conditions that have occurred, new environmental investigations are required.

The *1993 EA* stated that the purpose and need for improvements to I-10 between Tangerine Road and Ruthrauff Road was to:

- correct roadway, ramp, and frontage road deficiencies in design;
- correct undesirable levels of service within certain segments of the interstate and at several interchanges;
- provide future capacity and prevent operational issues relating to insufficient capacity; and,
- improve safety in high volume interchange areas, freeway segments on which traffic demands are approaching capacity conditions, and other areas.

The interest in a Twin Peaks Road TI has not waned. The first assumption in future growth projections developed for the transportation model used for the *2001-2025 Marana Transportation Plan Update (Plan Update)* was the construction of the Twin Peaks Road TI. At a public open house on the *Plan Update* in December 2000, the public's highest transportation priority was to extend Twin Peaks Road to I-10 to relieve the congestion on Cortaro and Ina Roads.

Project Need

The Twin Peaks Road TI and associated improvements are needed to:

- relieve existing and future congestion on Cortaro Road and Silverbell Road;
- eliminate stormwater from the I-10 mainline and frontage roads;
- correct issues related to roadways not meeting current design standards, and motor vehicle conflicts with the railroad; and,
- improve bicycle and pedestrian and general transportation system connectivity.

Each of these project needs is documented in detail in the following sections.

Congestion Relief

The need for a Twin Peaks Road TI has been discussed since the mid-1980s. Since that time, development patterns changed as a result of environmental restrictions. The major reason for these changing development patterns was the listing of the cactus ferruginous pygmy-owl (CFPO) as endangered in 1997. Much of the land considered highly desirable for residential development was located in habitat considered critical to the survival of the CFPO. As a result, the bulk of development shifted to areas outside those preferred by

the CFPO. Much of this development occurred within the Cortaro Road and Silverbell Road corridors. At the time the *Plan Update* was being completed, traffic congestion was concentrated along Cortaro Road, Ina Road, and Orange Grove Road in the vicinity of I-10 and at major arterial roadway intersections near retail centers.

Congestion of roadways and intersections is measured by capacity analyses according to procedures contained in the *2000 Highway Capacity Manual*. Capacity is defined by Level of Service (LOS) which is expressed as letters A to F (LOS A representing the best operating conditions and LOS F the worst). During morning and evening peak hour traffic, LOS D is considered acceptable for the urban situation characteristic of the area of the Twin Peaks Road TI. These LOS conditions are graphically depicted in Figure 2-1.

At the time of the *Plan Update*, Cortaro Road suffered some of the poorest operating conditions of any arterial in the Town of Marana. Cortaro Road had the highest number of segments operating at LOS F (4) and the highest percentage of segments operating at LOS F (80%) within the Town of Marana. Since the *Plan Update*, Cortaro Road, Cortaro Farms Road, and Ina Road west of I-10 were widened and additional widening is planned for Cortaro Farms Road east of I-10. This would continue to provide congestion relief in the area, but because Cortaro Farms Road crosses the UPRR at-grade, frequent passing trains cause substantial delays to motorists. According to PAG, approximately 50 to 65 UPRR trains pass through the area per day.

Traffic forecasts for the year 2030 were developed for this project using the regional transportation demand model. This information is presented in Table 2-1. The 2030 projected ADT volumes presented in Table 2-1 are developed from 24-hour traffic counts of existing traffic, projected development (both residential and employment) in the region, and proposed improvements to other roadways in the regional transportation network. The regional transportation demand model then forecasts traffic based on drivers selecting the paths of least resistance from projected origins (residential areas) to destinations (areas of employment and other destinations). According to the forecasts, a Twin Peaks Road TI would absorb a substantial amount of traffic from other roadways in the area. As shown in Table 2-1, 7,600 and 5,100 vehicles are displaced from Cortaro Road and Cortaro Farms Road west and east of I-10, respectively. However, Silverbell Road would experience the greatest relief. On Silverbell Road, 12,300 and 8,300 vehicles are displaced north and south of Cortaro Road, respectively.

A grade-separation at the UPRR would prevent drivers from experiencing train-related delays on Twin Peaks Road and would reduce congestion on other local roadways. It is important to note that traffic impacts related to railroad crossings are difficult to analyze in both the traffic capacity software (which produces LOS) and the transportation demand model (which forecasts traffic). It is likely that the transportation demand model volumes presented in Table 2-1 underestimate the amount of traffic that the Twin Peaks Road TI would displace, because drivers would favor grade-separated railroad crossings over at-grade crossings.

Figure 2-1. Levels of Service.

Level of Service A

Level of Service D

Level of Service B

Level of Service E

Level of Service C

Level of Service F

Courtesy of Logan Simpson Design, Inc.

Table 2-1. Comparison of 2030 Average Daily Traffic Volumes for Selected Roadway Segments With and Without Twin Peaks Road TI		
Roadway Segment (location)	**Without Twin Peaks Road TI**	**With Twin Peaks Road TI**
Silverbell Road (north of Cortaro Road)	48,000	35,700
Silverbell Road (south of Cortaro Road)	39,000	30,700
Cortaro Road (west of I-10)	26,000	18,400
Cortaro Farms Road (east of I-10)	27,000	21,900

Drainage

Standing water on a roadway can cause vehicle hydroplaning and a subsequent loss of control resulting in a vehicle crash; therefore, removing the water that falls on or flows across roadways is important to public safety. To determine the drainage conditions within the general area of the Twin Peaks Road TI, a drainage study was conducted.

The drainage conditions were summarized in the *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, Final Drainage Report,* dated May 21, 2004. According to the *Drainage Report*, some of the watersheds that drain to the area near the Twin Peaks Road TI originate in the Tortolita Mountains approximately 12 miles to the northeast. Runoff flows from the mountains are impeded by the embankment for the UPRR tracks. In general, the UPRR tracks are higher in elevation than both the westbound frontage road and I-10 mainline, but the I-10 mainline is higher in elevation than the westbound frontage road. Of the 17 drainage structures under the UPRR, 16 are undersized for the 50-year rainfall event; therefore, during these events, ponding at these structures may occur. Water that cannot move through the structures, continues to flow northwest along the UPRR embankment to the next drainage structure. This pattern is consistent within the area of the Twin Peaks Road TI and continues beyond the limits of the Twin Peaks Road TI.

Drainage structures are located also under the I-10 frontage roads and I-10 mainline (16 culverts under the westbound frontage road and 12 under I-10) to allow water to drain to the Santa Cruz River. The drainage pattern at these structures follows that of the UPRR: flows that are not conveyed under I-10 and its frontage roads by undersized drainage structures continue to the northwest along the roadway. Generally there is adequate drainage capacity to prevent the 50-year rainfall event from ponding on the I-10 frontage roads and mainline because of a combination of: 1) the metering of flows to the roadways by the UPRR drainage structures; 2) the capacities of the I-10 frontage road and I-10 mainline drainage structures; and, 3) the capacities of the roadside ditches which transmit flows along the roadways to the northwest. In one area north of the Twin Peaks Road TI and one location south of the Twin Peaks Road TI, however, runoff exceeds the capacity of this system. In these locations, water can flow over the westbound frontage road and the I-10 mainline during the 50-year rainfall event.

Drainage improvements are needed to the I-10 mainline and frontage road drainage structures to prevent runoff from flowing over the mainline and frontage road and possible vehicle hydroplaning.

Design Related Issues

The existing roadway system does not meet current design standards and crosses the UPRR tracks at-grade. These issues are discussed in the following paragraphs.

Frontage Roads

Frontage roads exist along both sides of I-10 in the vicinity of the Twin Peaks Road TI. The westbound frontage road provides two lanes of one-way travel from Cortaro Road to Avra Valley Road. The frontage road west of I-10 provides two lanes of one-way travel eastbound only from Arizona Pavilions Drive (just north of the eastbound Cortaro Road off-ramp) to Cortaro Road. From Arizona Pavilions Drive north to Avra Valley Road, the west side frontage road allows two-way travel with one lane in each direction.

In accordance with the *General Plan*, ADOT has been systematically converting I-10 frontage roads from two-way to one-way operation in the Tucson area. The frontage road from Arizona Pavilions Drive north to Tangerine Road is the last remaining segment of two-way I-10 frontage road in the Tucson metropolitan area. As a result, this segment of frontage road operates differently than other segments in the Tucson area. These operational differences may confuse drivers who expect one-way frontage road operation and, as traffic volumes increase, the potential for head on collisions and crashes typical of vehicles slowing to make turns (e.g., rear end crashes) increases; therefore, conversion of the two-way frontage road on the west side of I-10 to a one-way eastbound frontage road is needed to promote better operations and to comply with ADOT policy.

The two-way frontage road interferes also with proper interstate frontage road operation. According to the 1991 *Change of Access Report*, the frontage road system is intended to: 1) provide direct and reasonable access to properties adjacent to the frontage roads; 2) provide arterial service to supplement corridor capacity; 3) preserve the interstate character of the freeway by encouraging drivers making short trips to use the frontage road; 4) facilitate local circulation; and, 5) provide a parallel facility for temporary diversion of freeway traffic during maintenance, construction, or freeway closures. These functions cannot be adequately met with two-way operation of the eastbound frontage road.

The frontage roads do not meet current clear zone design guidelines. The American Association of State Highway and Transportation Officials' (AASHTO) *Roadside Design Guide* (1996) recommends a clear zone or recovery zone adjacent to roadways. This clear zone will allow a vehicle that has left the roadway to recover and return to the roadway without colliding with roadside obstacles. Clear zone widths are based upon roadway design speed, traffic volumes, and slopes adjacent to the roadway. The frontage roads have a relatively high speed limit (55 mph), relatively flat slopes, and traffic volumes between 1,600 and 3,500 Vpd. The *Roadside Design Guide* recommends a clear zone width of approximately 25 feet under these conditions. Along the westbound frontage road, concrete headwalls of irrigation structures are within approximately 6 feet of the

roadway. Along the eastbound frontage road, numerous structures such as utility poles, mailboxes, and other obstructions encroach within the recommended clear zone. To meet AASHTO guidelines, obstructions within the clear zone should either be removed or an energy absorbing barrier placed between the obstruction and the roadway.

Railroad Conflicts

At-grade railroad crossings are a concern. At-grade railroad crossings have a higher potential for serious vehicle/train accidents than do grade-separated railroad crossings. Currently El Camino de Mañana and Cortaro Road both cross the railroad at-grade.

Although waiting for a train to pass an at-grade crossing is an inconvenience to most motorists, it can pose time delays to emergency response personnel. Northwest Medical Center, at an early public agency scoping meeting for this project, stated that the at-grade crossings may result in extended delays for emergency medical personnel trying to reach patients on the west side of I-10 and transporting them to hospital facilities on the east side of I-10. These delays may be critical to some patients.

Connectivity

Transportation System Connectivity

Lack of access to destinations east of I-10 limits circulation within the area. The TIs at Avra Valley Road and Cortaro Farms Road are approximately four miles apart. The Town of Marana, as part of the *Plan Update* and ADOT, as part of the *DCR Ruthrauff Road to the Pima/Pinal County Line,* both determined the need for a new major arterial roadway that would cross the I-10 Corridor in the vicinity of Twin Peaks Road. In the PAG *Regional Transportation Plan,* the Twin Peaks Road TI and roadway was projected to serve a substantial amount of traffic both crossing and accessing I-10.

Bicycle and Pedestrian Connectivity

Within the study area, there are few pedestrian and bicycle amenities. According to the *Plan Update*, on-street bicycle lanes and paved shoulders throughout the Town of Marana are generally isolated facilities that do not interconnect with the surrounding network. Within the area, pedestrian and bicycle amenities are provided only on Twin Peaks Road from Silverbell Road to its eastern terminus. According to the *Plan Update,* all new collector and arterial roadways should include sidewalks 6 feet in width on both sides of the roadway to accommodate pedestrians, especially people with disabilities. The *Plan Update* suggests also that new arterial roadways at a minimum include shared use paths on one side of the roadway within the right-of-way.

The Town of Marana's *General Plan Update* promoted alternative modes of transportation and park and ride lots and stated that the connection of a paved system of bicycle and pedestrian trails to the region's Santa Cruz River Corridor system was of importance. To improve connectivity to the Santa Cruz River Shared Use Path and other facilities on both sides of I-10, improvements to bicycle and pedestrian facilities within the area of the Twin Peaks Road TI are needed.

Project Purpose

The purpose of the proposed project is to address each of the needs identified above. The proposed project would:

- Improve traffic operations on the area's transportation network by providing an additional access point to I-10 and a grade-separated crossing of the UPRR;
- Correct drainage deficiencies on the I-10 mainline and frontage roads;
- Address design related issues by: eliminating an existing at-grade railroad crossing; providing a new grade-separated railroad crossing; improving the consistency of frontage road traffic operations; improving the I-10 frontage roads' clear zones to current design guidelines; and,
- Improve overall connectivity of all modes of transportation within the area, including pedestrians and bicycles.

The proposed improvements that would fulfill the project purposes are discussed in detail in Chapter 3, *Alternatives*.

Conformance with Regulations, Land Use Plans, and Other Plans

Proposed improvements should conform to currently adopted transportation and land use plans and zoning ordinances. This section discusses the compatibility of the proposed project with existing regulations, land use plans, and other plans.

Town of Marana General Plan Update

The *General Plan Update* was adopted by the Marana Town Council in November 2002 as a broad collection of goals, policies, and implementation strategies that provide overall direction for future growth and development. The *General Plan Update* stated that the Twin Peaks Road TI was essential to establish proper arterial spacing and to distribute I-10 loading. The Twin Peaks Road TI improvements and frontage road traffic flow adjustments were anticipated also to enhance economic development along the I-10 Corridor. The *General Plan Update* promoted alternative modes of transportation and park and ride lots and stated that the connection of a paved system of bicycle and pedestrian trails to the region's Santa Cruz River Corridor system was of importance.

Marana Transportation Plan Update, 2001-2025

The *Transportation Plan Update*, which updated the original 1989 plan, was adopted in July 2001. According to the *Transportation Plan Update,* a large portion of the Town of Marana's population will be concentrated near Continental Ranch; therefore, construction of the Twin Peaks Road TI by 2010 was noted as a critical component of the traffic growth forecasts. The *Transportation Plan Update* contained also recommendations for transportation modes other than roadways and discussed the importance of interconnecting these facilities. On-street bicycle lanes, shared use lanes or paved shoulders, and sidewalks were proposed on all new or reconstructed arterial and collector

roadways. At *Transportation Plan Update* open houses, the highest roadway priorities were to extend Twin Peaks Road to I-10 to relieve Cortaro and Ina Roads and to provide more grade-separated crossings of the UPRR or re-route the railroad.

2025 Regional Transportation Plan (RTP)

PAG developed the *RTP* to guide long range improvements to bus, roadway, bicycle, pedestrian, aviation, and rail transportation systems in the eastern Pima County region. The *RTP* is the result of a multi-jurisdictional planning effort consisting of the Town of Oro Valley, City of South Tucson, City of Tucson, Pascua Yaqui Tribe, Pima County, Tohono O'Odham Nation, Town of Marana, Town of Sahuarita, and the Arizona State Transportation Board. As a result, the *RTP* is the best representation of the transportation needs for eastern Pima County. The Twin Peaks Road TI is contained in the *RTP*.

Town of Marana Santa Cruz River Corridor Plan

The 2001 *Santa Cruz River Corridor Plan* contained several goals pertinent to the Twin Peaks Road TI, including: 1) develop a Santa Cruz River corridor plan that reflected the character of the community; 2) integrate planning for the Santa Cruz River corridor with related planning activities; 3) assist in efficiently providing infrastructure needs; and, 4) facilitate planning for the De Anza National Historic Trail, including the trail itself, access, interpretive facilities, and historic De Anza campsites. According to the *Santa Cruz River Corridor Plan,* seriously inadequate transportation crossings of the Santa Cruz River, railroad, and I-10 complicated efforts to unite the community on opposite sides of these features. The heavily traveled at-grade railroad crossings at Ina Road, Cortaro Road, and Tangerine Road were noted as major safety concerns and increasingly severe congestion problems. The *Santa Cruz River Corridor Plan* recommended also two trails along the Santa Cruz River corridor: the Santa Cruz River Shared Use Path and the Marana segment of the De Anza National Historic Trail.

Continental Ranch Specific Plan

The *Specific Plan* was first adopted in April 1988 and has been amended 8 times through 2002. The *Specific Plan* established comprehensive guidance and regulations for the 2,400-acre Continental Ranch development. The *Specific Plan* was regulatory and adopted by Town of Marana ordinance. The transportation circulation concept plan within the *Specific Plan* established the transportation system layout for the area (including Twin Peaks Road) and stated that residents from the development would initially access I-10 at Cortaro Road and in the future they would access I-10 at Twin Peaks Road. A Twin Peaks Road extension across the Santa Cruz River was illustrated in the circulation maps. The *Specific Plan* recommended bicycle and pedestrian trails along roadways and open space corridors.

Town of Marana Park, Trail, and Open-Space System Master Plan

The *Park Plan*, dated July 2000, was developed to identify community needs for parks, trails, and open space and provide a long-range plan for meeting these needs. The *Park Plan* map showed a "Twin Peaks Road District Park" near the intersection of Twin Peaks Road and Silverbell Road and the "Linda Vista Boulevard District Park" north of the El Camino de Mañana/Linda Vista Boulevard intersection. Although the Linda Vista

Boulevard District Park was drawn over part of El Camino de Mañana, the map stated also, "location approximate". A proposed local trail (Scottie's Loop Trail) appeared to cross both El Camino de Mañana and Linda Vista Boulevard near the intersection.

Final Tres Rios del Norte (TRDN) Feasibility Study

This study was completed in August 2001 as a coordinated effort between the Corps, Pima County, the City of Tucson, and the Town of Marana. The purpose of the *TRDN Feasibility Study* was to provide water resource and ecosystem improvements within the Santa Cruz River channel. The *TRDN Feasibility Study* consisted of several distinct parts, but its planning objectives were to: 1) increase habitat values and function of native plant and wildlife species identified in Pima County's proposed Sonoran Desert Conservation Plan (SDCP); 2) attract wetland and riparian avian species identified in the SDCP; 3) facilitate wildlife movements for species identified in the SDCP; 4) establish the presence of amphibian species, reptilian species, mammalian species, and avian species in the area; 5) control or manage non-native, invasive plant species in the area; and 6) restore natural Santa Cruz River flow paths. The *TRDN Feasibility Study* described several implementation measures that would address the planning objectives. Some of these measures included: 1) create mesquite bosque at higher elevations from the Santa Cruz River bottom on terraces and over-bank areas; 2) establish cottonwood and willow tree communities along the wetted perimeter and fringe area locations within the Santa Cruz River; 3) create wetlands/Cienega at appropriate locations; 4) incorporate trails and other passive recreational features in support of the other restoration management measures; and, 5) reestablish desertscrub plant communities along the degraded upland portions of the Santa Cruz River corridor.

Additional discussion of these and other plans, proposed and adopted, may be found in later chapters of this document. In general, however, the transportation and land use elements of all plans discussed above were consistent with and supported the proposed Twin Peaks Road TI and associated improvements.

General Project Schedule

Environmental studies and development of design concepts for the Twin Peaks Road TI began in the Summer 2003. Environmental clearance for the proposed improvements is estimated to be obtained in 2006. Final Design for the proposed improvements is projected to begin in 2006 with an estimated completion of design in 2007. Construction of the Twin Peaks Road TI is projected to begin in 2007 with an estimated completion in 2009.